ABSTRACT OF THE DISCLOSURE

2-Chloro-9-(2-deoxy-2-fluoro- β-D-arabinofuranosyl)-*9H*-purin-6-amine is synthesized by reacting a 2-chloro-6-substituted purine with a protected and activated 2-deoxy-2-fluoro-D-arabinofuranose; and reacting with a base such as ammonia to provide 2-chloro-9-(2-deoxy-2-fluoro- β-D-arabinofuranosyl)-*9H*-purin-6-amine. When the purine reactant is substituted in the 6 position with a halogen, a reaction step with an alkoxide is carried out prior to the reaction with ammonia.